

# Project ICCARS

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A Proposal Submitted to  
The Federal Communications Commission

EDU2011 Pilot Program Grant  
WC Docket No. 10-222

Applicant: Wayne County Regional Educational Service Agency (RESA)

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**EDU2100 Pilot Program – WC Docket No. 10-222**  
**Project Field-based Science Experiences**

**Introduction**

It has been said that the driving force for the 21st century is the intellectual capital of citizens. Our country will only be able to effectively compete in the 21<sup>st</sup> century global marketplace if the intellectual potential of America's youth is developed now. What students learn and how they learn it is changing. The urgency for building the capacity of future American workers to work in the emerging digital age appears to be universally accepted.

The Wayne County Regional Educational Service Agency (RESA), which provides services to more than 366,000 K-12 students in 34 local school districts and 90 Public School Academies, secures funding for and implements innovative programs that are designed to help schools provide students with the educational experiences needed to develop 21<sup>st</sup> century skills. One of the innovative programs RESA is implementing to help students build the skills necessary to be scientifically literate, is a NASA funded STEM education project for grades 8-12, Investigating Climate Change and Remote Sensing (ICCARS). This is a science project developed by RESA and the Institute for Geospatial Research and Education (IGRE) at Eastern Michigan University (EMU). Dr. Yichun Xie is the Principal Investigator for this project.

Project ICCARS is an inquiry-based project with this primary goal: Students and teachers have a working understanding of the science behind global climate change and its relationship to human activity, in particular its relationship to land-use and land-cover (LULC) changes on multiple scales, through use of NASA data products and models and student gathered *in situ* data. The project engages students in the (a) development of research questions, (b) identification of data to be collected, (c) the actual, in-the-field collection of data, (d) analysis of data and (e) the dissemination of their research-based findings. It integrates the use of wireless technology to gather and communicate *in situ* data to a web-based project database and to project sites.

The primary outcomes of Project ICCARS are:

1. Students and teachers will understand how remotely sensed data can be used to study the phenomena of global climate change on multiple levels (i.e., scales of size: local, regional and global), be able to acquire remotely sensed data and produce meaningful information (including vegetation index, biomass and LULC change over time) from that data.
2. Students and teachers will understand how to collect and process a remotely sensed, four band image using the NASA AEROKATS kite based TwinCam-AeroPod sensor and

communicate that data.

3. Students and teachers will understand appropriate social networking tools and desktop videoconferencing to collaborate, share information and build a support community.

## **(1) Full Description of the Current and Planned Wireless Program**

### **a. Current Program**

This proposed project, which is a component of Project ICCARS, A key component of Project ICCARS is the usage of wireless devices for field data collection and real-time information exchange. The project links handheld technology (i.e., iPads and iPhones) with server technology and virtual forums to build a real-time device to conduct field data collection and to enhance social networking. The ICCARS Field Data Collector Application for iOS permits participants to record various field parameters, upload them to a server database, download records in the field, and quickly send inquiries concerning field observations to scientists and technologist at NASA, EMU, participating organizations, and even the public through the ICCARS eLearning Collaboratory (i.e., the social networking site developed specifically for this project - <http://geodata.acad.emich.edu/iccars/>).

Project ICCARS guides students in the process of taking geo-referenced photos of field observations and attribute these photos or attach inquiry questions and send them for web or handheld viewing. Go-to-meetings can be organized in real time by linking field teams with scientists in remote offices for creating a virtual Collaboratory for scientific investigations. The classical usages of handheld devices as a field GIS tool are also supported, such as mapping or capturing points, lines and polygons, entry of attributes and data to and from servers.

### **b. Future Uses**

Additional capabilities include incorporating in-field, user-created media as well as existing media from online resources accessible through the website for comparison (e.g., a field digital photo of invasive plant intrusion with an existing video of wetland deterioration). A field annotation template will be designed to have students share the process of conducting their field investigation, collecting investigation data and results. This will help students effectively scaffold their scientific reasoning by enabling virtual consultation with scientists and technologists in remote offices. The goal will be for the students to show their inquiry process through the handheld device along with the integration of the social interaction.

The use of wireless connectivity to access the (i) Project's Internet-based database, (ii) the Project's eCollaboratory for communication and (iii) other online resources, will greatly enhance the learning experiences provided. Wireless connectivity will also facilitate the interaction of project sites and the communication of participants with scientists and other students. This supports the constructivist approach to learning. The project is investigating the merits and challenges of wireless off-premises connectivity services for mobile learning devices as a means of providing students and teachers with real-time, in-the-field collaboration with experts and peers in order to come to a deeper understanding of the research being conducted.

### **c. Project History and Wireless Devices Used**

Project ICCARS began in July 2010 and is currently funded to run until July 2011. Plans for the sustainability of the project are currently being developed and project activities will be integrated into ongoing instruction provided at project schools. Teacher involvement in the project began on October 4, 2010. Teachers have been using iPad devices as of October 16, 2010. The project development team has been using the devices since the programs launch in July.

The project involves 32 teachers with an approximate student caseload of 1,120 students. The project is exploring the use of touch iPods for students and other devices that can facilitate interaction between project participants.

### **d. Technical Issues Connected With the Wireless Program**

The program requires participants to engage in field data collection using iPads with live connections to a server database. Students and teachers need access to server based observation records and datasets for both posting and retrieving data. Live collaboration with classrooms and experts while in the field is a critical component as well.

The NASA award specifically does not provide for service contracts for connectivity. As a result, teachers are required to pay out-of-pocket *per* device fee for an ATT 3G contract to use their iPads in the field. Wi-Fi is not an option in most instances in the field. Teachers are understandably reluctant to use more than one device, so the option of using additional field data collectors for capturing ground control point (GCP) data from multiple locations simultaneously with the main mission data is limited. Further, actual usage of the device to move data in the field may be restricted if teachers find it exceeds their contract allotments - currently at 250 Mb/month.

### **e. Project Training**

Participants in the first year of the program have already completed a six-week introductory course that included classroom instruction and fieldwork. Ongoing professional development is scheduled throughout the year as the teachers develop units of instruction and begin to involve students in data collection and analysis. Project instructional units and field data collection protocols are used. These require in-the-field collection of data.

Project ICCARS is a NASA funded program and designed for replication as a national model. All training materials and protocols will be available to the public as well as other resources developed during the program.

### **(2) Information Regarding the Poverty Level**

The Census Poverty Data for the schools in Wayne County, as provided by the U.S. Department of Education (DOE), indicates a range of 52.54% to 2.78% (*cf. Appendix A*) within the 24 schools districts in the County. Eleven districts have a rate over 20%. Although DOE has not yet published the new percentages, it is anticipated that the current unemployment in Michigan has considerably increased these percentages.

To supplement these data, the Michigan Center for Educational Performance and Information has reported that 2010 data dealing with the Free and Reduced Lunch count of students in Wayne County ranges from 99.31% to 5.20% with the average being 58.95%. Of the 125 buildings reported, 33 buildings have a rate of more than 90.00% (i.e., 26.00% of the schools in Wayne County).

These data provide a sense of the economic condition in Wayne County Michigan and the schools within Southeastern Michigan. It should be noted that Wayne County Schools educate more than 1/3<sup>rd</sup> of Michigan's students.

### **(3) Financial Need**

The data in *Table 1* present a snapshot of the conditions within Wayne County Michigan. Because of these conditions, schools have a financial need even with their current e-rate discount for assistance. Consider the fact that 48% of the households in Wayne County have incomes less than \$10,000 and that 14.9% of the population is living in poverty. These data reflect the state of affairs in Wayne County and in Wayne County schools. Many school districts in Wayne County are in a severe budget reduction mode as State funding for education continues to erode.

<i>Table 1. Wayne County K-12 Student Demographics</i>		
Description of Student Population	# of Students	% of Population
Total K-12 Student Population	324,378	
Student Minority Population	162,513	50.1%
Special Education (IDEA)	15,676	05.0%
English as a Second Language (Title III)	23,782	07.0%
Delinquent Students (Title I, Part D)	1,534	00.5%
Census Poor Students (Title I, Part A)	134,082	41.0%
Free Lunch Recipients	156,860	48.0%
Immigrant Students	2,278	00.7%

Wayne County General Demographics		
Description of General Population	# Citizens/Households	% of Population
Total Population	1,937,070	
Citizens Who Did Not Graduate from High School	445,526	23.0%
Households Living in Poverty	114,801	14.9%
Households with Less Than \$10,000 Income	92,221	48%
Per Capita Income	\$20,058	
Households With Children	289,469	38.0%
Youth Population (5-17)	425,080	20.6%
Home Foreclosures – Homes Owned	8,804	64.8%
<i>Statistics from the Michigan Department of Education (MDE) &amp; Southeast Michigan Council of Governments (SEMCOG)</i>		

#### **(4) Project Costs**

Current costs for this project are in excess of \$700,000. These costs include equipment, staff inservice training, transportation for student in-field experiments, school staff stipends for after school and Saturday activities and development activities conducted by Eastern Michigan University.

#### **(5) Funding Sources**

A grant provided by NASA covers approximately \$700,000 of the project and Wayne RESA and Eastern Michigan University are contributing approximately \$100,000 as in-kind staff, facilities and equipment. Schools involved in the project will be using the Discovery Streaming resources that are currently purchased by every school.

#### **(6) Impact of EDU2011 Support**

One of the primary objectives of Project ICCARS is to implement a model of real-time, in-the-field collaboration with experts. As students collect data in-the-field, wireless connectivity allows them to collaborate with NASA scientists, University staff and peers. It is hypothesized that real-time collaboration with experts can greatly enhance student learning.

## **(7) Cost-Effectiveness**

Since this project is just in its infancy and various resources are being gathered to fully implement it, no data is currently available that can be analyzed relative to cost-effectiveness. Consideration will be given, during the full implementation of the project, to collect such data that will allow for future analysis.

## **(8) Long Term Objectives of the Program**

The long-term objectives include the replication of this program throughout Southeastern Michigan, the State and then look to national dissemination. One of the long term objectives is to model how science project can integrate in-the-field, real-time collaboration with experts as a means of enhancing student understanding of the scientific process. Key to the achievement of this objective is the availability of cost-effective, wireless connectivity.

## **(9) Compliance with the Children's Internet Protection Act**

Wayne RESA and all schools involved in the project have State-approved Technology Plans which require an Acceptable Use Policy and enforce compliance with the Children's Internet Protection Act.

## **(10) Internal Policies**

Project ICCARS requires all staff and students involved in the project to sign an Acceptable Use Policy in addition to the one that they are required to sign by their school. Staff are instructed on the monitoring of student use of the Internet.

# **School Information**

## **(1) Location of Schools**

Schools in Project ICCARS are located in Wayne, Oakland and Monroe Counties in Michigan. Wayne County RESA, the fiscal agent for the project, is also located in Wayne County Michigan

## **(2) Participating Schools and Teachers**

Schools participating in the first year of Project ICCARS are:

- Laura Amatulli, Avondale MS – Oakland
- John Bayerl, Dearborn Center for Mathematics, Science and Technology – Wayne
- Lynn Bradley, Belleville HS – Wayne
- Wanda Bryant, Detroit Henry Ford HS – Wayne
- Caroline Chuby, University Prep Science and Mathematics MS – Wayne
- Russell Columbus, Monroe HS – Wayne
- Erica Conley-Shannon, Detroit Midtown Academy – Wayne
- Gregory Dombro, University Prep Science and Mathematics – Wayne

- Jennifer Gorsline, Dearborn Center for Mathematics, Science and Technology –
- Tom Green, Monroe HS and Monroe ISD - Monroe
- Dan Neil, Southgate Anderson HS - Wayne
- Kathleen O'Connor, University Prep Science and Mathematics MS - Wayne
- Deena Parks, Dearborn Center for Mathematics, Science and Technology - Wayne
- John Rama, Southgate Anderson HS - Wayne
- Darcie Ruby, Detroit Midtown Academy - Wayne
- Bruce Szczechowski, Southgate Anderson HS - Wayne

As the list indicates, there are students and teachers from Wayne, Oakland and Monroe Counties that are participating in the first year of this project. These teachers, and their students, were selected to be the developers of the project. They were selected out of more than 120 applications. Participating Schools were asked to send a “team” of teachers.

### **(3) Applicant School District**

The Wayne County Regional Educational Service Agency (RESA) is the applicant for this grant and is the fiscal agent and awardee of Project ICCARS grant. Wayne RESA is the largest of 57 such educational service agencies established by the Michigan Legislature to provide support services to schools within defined service delivery areas. The Wayne County Mathematics and Science Center, a program of Wayne RESA, designs, finds funding for and implements various school-based projects in order to help schools enhance teaching and learning. The Center, together with RESA’s Instructional Materials and Technology Department, are the sponsors of this project.

### **(4) Project’s Curriculum Objectives**

The primary curriculum objectives are taken from the Michigan Curriculum Framework. The primary objectives that are incorporated into all of the science disciplines are those that deal with “Inquiry”. There are also primary objectives in each of the following disciplines: Biology, chemistry, Earth Science and Physics. The project builds on the essential principles of Climate Science. They are:

#### **Climate Literacy: The Essential Principles of Climate Science**

- The Sun is the Primary Source of Energy for Earth’s Climate System.
- Climate is regulated by complex interactions among components of the Earth System.
- Life on Earth depends on, is shaped by, and affects climate.
- Climate varies over space and time through both natural and man-made processes.
- Our understanding of the climate system is improved through observations, theoretical studies, and modeling.
- Human activities are impacting the climate system.



- Climate change will have consequences for the Earth System and human lives.

In order to support students in the development of those skills integral to climate literacy, various curriculum objectives from each of the major disciplines are addressed by the project. This project is intended to be a cross-discipline science project.

### *The Michigan's High School Science Content Expectations*

## **INQUIRY, REFLECTION, AND SOCIAL IMPLICATIONS**

### **1.1 Scientific Inquiry**

Science is a way of understanding nature. Scientific research may begin by generating new scientific questions that can be answered through replicable scientific investigations that are logically developed and conducted systematically. Scientific conclusions and explanations result from careful analysis of empirical evidence and the use of logical reasoning. Some questions in science are addressed through indirect rather than direct observation, evaluating the consistency of new evidence with results predicted by models of natural processes. Results from investigations are communicated in reports that are scrutinized through a peer review process.

### **1.2 Scientific Reflection and Social Implications**

The integrity of the scientific process depends on scientists and citizens understanding and respecting the “Nature of Science.” Openness to new ideas, skepticism, and honesty are attributes required for good scientific practice. Scientists must use logical reasoning during investigation design, analysis, conclusion, and communication. Science can produce critical insights on societal problems from a personal and local scale to a global scale. Science both aids in the development of technology and provides tools for assessing the costs, risks, and benefits of technological systems. Scientific conclusions and arguments play a role in personal choice and public policy decisions. New technology and scientific discoveries have had a major influence in shaping human history. Science and technology continue to offer diverse and significant career opportunities.

## **BIOLOGY**

### **STANDARD B3: Interdependence of Living Systems and the Environment**

Students describe the processes of photosynthesis and cellular respiration and how energy is transferred through food webs. They recognize and analyze the consequences of the dependence of organisms on environmental resources and the interdependence of organisms in ecosystems.

## **CHEMISTRY**

### **C5.8 Carbon Chemistry**

The chemistry of carbon is important. Carbon atoms can bond to one another in chains, rings, and branching networks to form a variety of structures, including synthetic polymers, oils, and the large molecules essential to life.

## **EARTH SCIENCE**

### **STANDARD E2: EARTH SYSTEMS**

Students describe the interactions within and between Earth systems. Students will explain how both fluids (water cycle) and solids (rock cycle) move within Earth systems and how these movements form and change their environment. They will describe the relationship between physical process and human activities and use this understanding to demonstrate an ability to make wise decisions about land use.

### **STANDARD E4: THE FLUID EARTH**

Students explain how the ocean and atmosphere move and transfer energy around the planet. They also explain how these movements affect climate and weather and how severe weather impacts society. Students explain how long term climatic changes (glaciers) have shaped the Michigan landscape. They also explain features and processes related to surface and ground-water and describe the sustainability of systems in terms of water quality and quantity.

## **PHYSICS**

### **4.1 Energy Transfer**

Moving objects and waves transfer energy from one location to another. They also transfer energy to objects during interactions (e.g., sunlight transfers energy to the ground when it warms the ground; sunlight also transfers energy from the Sun to the Earth).

### **(5) Data Collected**

Project ICCARS began with the beginning of the 2010 school year. Teachers and students are currently working on the production of lesson plans, a Manual for the use of the equipment involved in the project, on the eCollaboratory and on projects. While an evaluation plan is in place, the collection of data has not yet begun. There will be data available in June.

As noted above, during the second year there will be 32 teachers and 1,120 students involved. During the developmental phase of the project (i.e., First Year), there are 16 teachers with 560 students involved.

## **APPENDICIES**

## Appendix A

**Chart 1: Census Poverty Data by Local Educational Agency  
WAYNE COUNTY, MICHIGAN**

<b>State</b>	<b>Name of Local Educational Agency (LEA)</b>	<b>Percent</b>
MI	HAMTRAMCK PUBLIC SCHOOLS	52.54%
MI	HIGHLAND PARK CITY SCHOOLS	48.08%
MI	INKSTER CITY SCHOOL DISTRICT	43.55%
MI	ECORSE PUBLIC SCHOOL DISTRICT	38.07%
MI	DETROIT CITY SCHOOL DISTRICT	37.73%
MI	DEARBORN CITY SCHOOL DISTRICT	35.63%
MI	RIVER ROUGE SCHOOL DISTRICT	35.06%
MI	WESTWOOD COMMUNITY SCHOOLS	27.41%
MI	ROMULUS COMMUNITY SCHOOLS	22.15%
MI	TAYLOR SCHOOL DISTRICT	21.00%
MI	MELVINDALE-NORTH ALLEN PARK SCHOOL	19.45%
MI	WAYNE-WESTLAND COMMUNITY SCHOOL DIS	18.27%
MI	CRESTWOOD SCHOOL DISTRICT	17.76%
MI	LINCOLN PARK PUBLIC SCHOOLS	17.34%
MI	FLAT ROCK COMMUNITY SCHOOLS	16.54%
MI	DEARBORN HEIGHTS SCHOOL DISTRICT NU	16.03%
MI	VAN BUREN PUBLIC SCHOOLS	15.44%
MI	REDFORD UNION SCHOOL DISTRICT	12.76%
MI	WOODHAVEN-BROWNSTOWN SCHOOL DISTRIC	12.45%
MI	WYANDOTTE CITY SCHOOL DISTRICT	12.06%
MI	HARPER WOODS	11.48%
MI	SOUTH REDFORD SCHOOL DISTRICT	10.97%
MI	GARDEN CITY SCHOOL DISTRICT	10.50%
MI	SOUTHGATE COMMUNITY SCHOOL DISTRICT	10.05%
MI	GIBRALTAR	8.91%
MI	HURON SCHOOL DISTRICT	8.88%
MI	RIVERVIEW COMMUNITY SCHOOL DISTRICT	8.69%
MI	TRENTON	8.25%
MI	ALLEN PARK PUBLIC SCHOOLS	7.01%
MI	LIVONIA PUBLIC SCHOOLS	6.50%
MI	PLYMOUTH-CANTON COMMUNITY SCHOOLS	5.56%
MI	GROSSE POINTE PUBLIC SCHOOLS	4.88%
MI	GROSSE ILE TOWNSHIP SCHOOLS	4.01%
MI	NORTHVILLE PUBLIC SCHOOLS	2.78%
<b>WAYNE COUNTY</b>		<b>18.46%</b>

Appendix B

**2010 Free and Reduced Lunch Data for Wayne County**

DCODE		Free Lunch Eligible	Reduced-Price Lunch Eligible	Not Eligible	Total Count	% Free Lunch Eligible
82000	Wayne RESA	8	0	22	30	26.67%
82010	Detroit City School District	67901	2128	18474	88503	79.13%
82020	Allen Park Public Schools	859	294	2616	3769	30.59%
82030	Dearborn City School District	10608	924	6952	18484	62.39%
82040	Dearborn Heights School District #7	1378	336	1123	2837	60.42%
82045	Melvindale-North Allen Park Schools	1582	334	851	2767	69.24%
82050	Garden City School District	1818	396	2966	5180	42.74%
82055	Grosse Pointe Public Schools	748	132	7482	8362	10.52%
82060	Hamtramck Public Schools	2539	113	485	3137	84.54%
82070	Highland Park City Schools	1321	11	513	1845	72.20%
82080	School District of the City of Inkster	2397	120	763	3280	76.74%
82090	Lincoln Park Public Schools	2672	499	1448	4619	68.65%
82095	Livonia Public Schools	2801	783	12991	16575	21.62%
82100	Plymouth-Canton Community Schools	2301	615	16203	19119	15.25%
82110	Redford Union School District	1628	279	1404	3311	57.60%
82120	River Rouge School District	1115	46	132	1293	89.79%
82130	Romulus Community Schools	2262	400	1213	3875	68.70%
82140	South Redford School District	1394	316	1716	3426	49.91%
82150	Taylor School District	4600	863	2863	8326	65.61%
82155	Trenton Public Schools	560	102	2211	2873	23.04%
82160	Wayne-Westland District	6257	1200	5485	12942	57.62%
82170	Wyandotte City School District	1963	403	2491	4857	48.71%
82180	Flat Rock Community Schools	640	154	1140	1934	41.05%
82230	Crestwood School District	1596	340	1511	3447	56.16%
82240	Westwood Community Schools	1735	101	724	2560	71.72%
82250	Ecorse Public School District	541	3	415	959	56.73%
82290	Gibraltar School District	932	200	2590	3722	30.41%
82300	Grosse Ile Township Schools	111	33	1708	1852	7.78%
82320	City of Harper Woods Schools	800	90	455	1345	66.17%
82340	Huron School District	599	159	1736	2494	30.39%
82365	Woodhaven-Brownstown School District	1374	336	3355	5065	33.76%
82390	Northville Public Schools	316	64	6934	7314	5.20%
82400	Riverview Community School District	637	183	1870	2690	30.48%
82405	Southgate Community School District	1975	477	3251	5703	42.99%
82430	Van Buren Public Schools	2341	374	3030	5745	47.26%
82701	University Preparatory (PSAD)	192	38	152	382	60.21%
82702	University Preparatory Academy	1145	168	344	1657	79.24%
82703	Henry Ford Academy	216	58	108	382	71.73%
82716	Vista Meadows Academy	51	0	10	61	83.61%
82717	Achieve Charter Academy	48	16	499	563	11.37%
82718	Quest Charter Academy	196	35	100	331	69.79%
82719	Washington-Parks Academy	147	26	150	323	53.56%
82720	Lincoln-King Academy	147	21	116	284	59.15%
82721	McGivney Academy (SDA)	3	0	10	13	23.08%

82902	Casa Richard Academy	98	14	24	136	82.35%
82903	Aisha Shule/WEB Dubois Academy School	211	5	32	248	87.10%
82904	Plymouth Educational Center	776	135	232	1143	79.70%
82905	Nataki Talibah Schoolhouse of Detroit	254	10	132	396	66.67%
82907	Michigan Technical Academy	998	73	172	1243	86.16%
82909	Academy of Detroit-West	271	24	26	321	91.90%
82910	Academy	251	15	48	314	84.71%
82911	Gaudior Academy	113	25	53	191	72.25%
82912	Academy of Westland	375	17	32	424	92.45%
82913	Woodward Academy	443	57	58	558	89.61%
82914	Colin Powell Academy	520	28	43	591	92.72%
82915	Eaton Academy	335	38	94	467	79.87%
82916	Summit Academy	190	43	172	405	57.53%
82917	Michigan Health Academy	161	3	39	203	80.79%
82918	Cesar Chavez Academy	1742	59	48	1849	97.40%
82919	Academy	238	9	5	252	98.02%
82921	Academy for Business and Technology	545	56	52	653	92.04%
82922	Nsoroma Institute	146	20	27	193	86.01%
82923	Chandler Park Academy	1418	98	203	1719	88.19%
82924	Marvin L. Winans Academy	978	121	308	1407	78.11%
82925	Detroit Community Schools	834	54	170	1058	83.93%
82926	Henry Ford Academy	188	55	236	479	50.73%
82927	HEART Academy	160	22	38	220	82.73%
82928	The Dearborn Academy	453	7	21	481	95.63%
82929	Detroit Academy of Arts and Sciences	1435	72	348	1855	81.24%
82930	Dove Academy of Detroit	400	23	46	469	90.19%
82933	Timbuktu Academy	317	7	12	336	96.43%
82937	George Crockett Academy	378	16	38	432	91.20%
82938	Summit Academy North	535	143	807	1485	45.66%
82939	Pierre Toussaint Academy	395	15	45	455	90.11%
82940	Voyageur Academy	614	52	132	798	83.46%
82941	Star International Academy	1040	117	147	1304	88.73%
82942	Hope Academy	453	0	44	497	91.15%
82943	Weston Preparatory Academy	296	27	83	406	79.56%
82945	Edison Public School Academy	596	134	345	1075	67.91%
82947	David Ellis Academy	189	45	86	320	73.13%
82948	Ross Hill Academy	161	9	16	186	91.40%
82949	Center for Literacy and Creativity	79	4	33	116	71.55%
82950	Universal Academy	473	4	23	500	95.40%
82953	Detroit Service Learning Academy	812	98	218	1128	80.67%
82955	Allen Academy	1007	7	46	1060	95.66%
82956	Old Redford Academy	1409	166	332	1907	82.59%
82957	Hope of Detroit Academy	437	12	39	488	92.01%
82958	Joy Preparatory Academy	420	18	26	464	94.40%
82959	West Village Academy	312	33	58	403	85.61%
82960	Cherry Hill School of Performing Arts	861	21	173	1055	83.60%
82961	Academy of Inkster	172	10	18	200	91.00%
82962	New Beginnings Academy	121	15	48	184	73.91%
82963	George Washington Carver Academy	463	1	31	495	93.74%
82964	Detroit Midtown Academy	301	0	21	322	93.48%
82967	Metro Charter Academy	338	72	311	721	56.87%

82968	Canton Charter Academy	60	26	625	711	12.10%
82969	Creative Montessori Academy	200	72	382	654	41.59%
82970	Warrendale Charter Academy	602	39	88	729	87.93%
82971	Blanche Kelso Bruce Academy	415	0	75	490	84.69%
82973	Trillium Academy	343	47	337	727	53.65%
82974	Detroit Merit Charter Academy	544	52	121	717	83.12%
82975	Riverside Academy	987	20	20	1027	98.05%
82976	Keystone Academy	129	53	564	746	24.40%
82977	Hamtramck Academy	425	17	38	480	92.08%
82978	Life Skills Center of Metropolitan Detroit	278	11	52	341	84.75%
82979	Detroit Enterprise Academy	576	60	65	701	90.73%
82980	Business Entrepreneurship,	432	2	3	437	99.31%
82981	American Montessori Academy	113	18	315	446	29.37%
82982	Universal Learning Academy	396	37	37	470	92.13%
82983	Bridge Academy	581	0	5	586	99.15%
82984	Dr. Charles Drew Academy	375	9	35	419	91.65%
82985	Detroit Premier Academy	622	40	77	739	89.58%
82986	Hanley International Academy	535	17	62	614	89.90%
82987	Frontier International Academy	321	0	5	326	98.47%
82988	Discovery Arts and Technology PSA	194	7	19	220	91.36%
82989	Covenant House Life Skills Center West	172	5	74	251	70.52%
82990	Covenant House Life Skills Center East	251	0	62	313	80.19%
82991	Covenant House Life Skills Center Central	300	1	18	319	94.36%
82992	Northpointe Academy	234	4	31	269	88.48%
82994	David Ellis Academy West	489	70	275	834	67.03%
82995	Taylor Exemplar Academy	280	95	302	677	55.39%
82996	Clara B. Ford Academy (SDA)	178	0	9	187	95.19%
82997	Flagship Charter Academy	513	24	40	577	93.07%
82998	ACE Academy (SDA)	161	0	25	186	86.56%
Totals		170864	16005	130142	317011	70.45%

% of all students eligible for  
FRL: 58.95%